Medical management includes care of the paralyzed orbit (half-moon-shaped paper tape fixed to the upper eyelid to stiffen and partially close the eye, used with glasses to prevent drying and frequent application of artificial tears), physiotherapy, and management of inflammatory and metabolic diseases including Bell palsy.

Counseling a patient with a paralyzed face is vital. A patient with facial palsy should be informed of the diagnosis, the type of lesion, etiologic factors and the significance of the results of the diagnostic tests. The patient also should be instructed carefully about management, expected timing of recovery, and the recommended sequence of medical and surgical procedures—including alternatives to them.

A patient with paralysis and distortion of a portion of his face must live with a severe social and functional handicap. The influence of gravity combined with the unopposed antagonistic pull of the opposite mimetic musculature of the face creates an extremely harsh bearing. Topographic testing to locate the site of the lesion of a paralyzed face is now well established. Modern microsurgical techniques used with dynamic and static procedures are highly successful for partial correction of paralyzed faces.

MANSFIELD F. W. SMITH, MD

REFERENCES

Johnson J, Tucker HM: Selective reennervation of paralyzed facial muscles: A progress report. Trans Am Acad Ophthalmol Otolaryngol 84:304-309, Mar-Apr 1977

May M, Hardin WB Jr: Facial palsy interpretation of neurological findings. Trans Am Acad Ophthalmol Otolaryngol 81: in press, Jul-Aug 1977

Craniofacial Surgical Operation For Head and Neck Neoplasms

LARGE TUMORS of the head and neck generally are considered to be unresectable if they have become fixed to the base of the skull. For certain portions of this region this is very true; for example, excisions of the clivus must be limited to small peek holes because of the proximity of the pons and the certainty of sudden death if a major portion of this part of the sphenoid is removed. Thanks to the pioneering work of Lewis, Klopp, Smith and Ketchum, lesions of the head and neck that are fixed to the floors of the anterior and middle cranial fossae have become amenable to resection with a respectable chance of tumor ablation.

The ethmoidal and frontal sinuses and the nasal roof border on the anterior fossa. Spread occurs by extension through the posterior wall of the frontal sinus, or superiorly through the fovea ethmoidalis or the cribriform plate. The infratemporal fossa, the pterygomaxillary space, the sphenoid sinus and the temporal bone are adjacent to the floor of the middle fossa. Lesions of the nasopharynx, maxillary sinuses and nasal cavities may spread directly to these areas and thereby gain access to this part of the cranial cavity.

The most common benign lesion that may extend into the cranial cavity in this fashion is the juvenile nasopharyngeal angiofibroma. Its usual mode of intracranial extension is via the infratemporal fossa, through the greater wing of the sphenoid into the middle fossa. It may exert pressure on the orbital apex causing proptosis. Transfacial excision of such a lesion carries high mortality because of the difficulty in controlling extradural hemorrhage from the tumor vessels supplied by the internal carotid system. This supply is confirmed by angiography.

Carcinoma of the paranasal sinuses spreading to the cranial cavity by erosion through the floor of the anterior cranial fossa may fix to dura or invade the frontal lobes. Tomography in the Caldwell position usually shows the site and extent of this bone erosion. Tumors of the ear, such as glomus jugulare tumor and squamous and basal cell carcinoma, have been successfully treated using a combined approach since the early work of Campbell. Temporal bone polytomography and computerized axial tomography have greatly improved the assessment of extension of these tumors.

Craniofacial operations require the close cooperation of a neurosurgeon and otolaryngologist. Tumors that involve the anterior fossa and anterior reaches of the middle fossa are reached through a frontal and anterolateral craniotomy, respectively. A coronal or anterolateral scalp incision is made and a sterile towel covered with an antibiotic-soaked sponge is sutured to the base of the flap. This isolates the intracranial from the transfacial part of the operation. After a cranial bone flap has been removed the tumor is exposed from above and any involvement of dura or brain is excised. The dura is repaired with a fascia graft. The transfacial portion is dissected free and then with the neurosurgeon working from above, the tumor is delivered through the facial incision. The cavity is skin grafted and any cerebrospinal fluid that was removed earlier in the procedure is injected into the ventricular system to help fill out

the intracranial volume and prevent the formation of dead space between dura and cranium.

Of Ketchum's series in roughly a third of the patients no complications occurred, in another third there were minor complications and in the remaining third there were major life-threatening complications requiring intensive care and prolonged hospital stays. Most of the major complications occurred in patients who had received preoperative radiation treatment. This is similar to our own experience. Remembering that malignant lesions and benign tumors such as nasopharyngeal angiofibromas with intracranial extension were considered by many to be unresectable and for the most part incurable, this high complication rate appears justifiable.

Our experience with excision of tumors such as angiofibromas, esthesioneuroblastoma and carcinoma of the maxillary and ethmoid sinuses supports this concept of combined intracranial-transfacial excision.

PAUL J. DONALD, MD

REFERENCES

Lewis JS, Page R: Radical surgery for malignant tumors of the ear. Arch Otolaryngol 83:114-119, Feb 1966

Smith RR, Klopp CT, Williams JM: Surgical treatment of cancer of the frontal sinus and adjacent areas. Cancer 7:991-994, Sep 1954

Ketchum AS, Cretien PB, Schour L, et al: Surgical treatment of patients with advanced cancer of the paranasal sinuses in MD Anderson Hospital. *In* Clinical Conference of Cancer—17, Anderson Hospital and Tumor Institute: Neoplasia of Head and Neck. Chicago, Year Book Medical Publishers, Inc, 1974, pp 187-202

Campbell E, Volk BM, Burkland CW: Total resection of the temporal bone for malignancy of the middle ear. Ann Surg 134: 397-404, Sep 1951

Immunity in Head and Neck Malignancy

Prognosis

ALTHOUGH NOTED in epidermoid cancers at other sites (for example, breast, colon and lung) the correlation between impaired nonspecific immune response and survival is nowhere stronger than in tumors of the upper aerodigestive system. The ability to show topical sensitization to 2, 4 dinitrochlorobenzene (DNCB) on secondary challenge has proved thus far the most popular and reliable *in vivo* assessment of the integrity of T-lymphocyte (cellular immune) function, thought to bear the major responsibility for tumor immune response. Eilber, Morton and Ketcham, for example, investigated 120 patients with a broad spectrum of head and neck malignancy. Of patients with localized and operable disease, 64 percent were DNCB reactive; 89 percent of these patients remained free of disease at six months irrespective of treatment. On the other hand, 85 percent of patients with locally advanced or disseminated disease were nonreactive to initial sensitization; only one of this group was alive one year later. Furthermore, posttreatment testing showed that a continued positive, or conversion from negative to positive, response was associated with tumor control in all cases.

Therapy

Unlike assessment of prognosis, immunotherapy in head and neck epidermoid cancer has not yet been widely initiated. However, several important theoretical principles already have emerged from pilot clinical and laboratory investigations. First, the maximum response capacity of a healthy, unaided immune system will destroy between 100 million and 1 billion cells, a tumor load only approaching detectability by conventional means. Second, the immune response destroys all cells within its capacity, unlike radiation or chemotherapy—both of which effect only those cells which are cytokinetically or biochemically vulnerable. Finally, the immune response is thought to be ubiquitously effective, so that targeted cells residual at the primary site, in regional lymphatics or distant in the viscera are equally subject to destruction. All of these considerations lead one to conclude that the first application of immunotherapy to malignancies of the head and neck will be in conjunction with contemporary modalities when tumor load is lowest.

ROBERT C. BONE, MD

REFERENCES

Berlinger NT, Good RA: Contemporary immunologic considerations in head and neck tumors. Otol Clin North Am 7: 859-883, Oct 1974

Eilber RF, Morton DL, Ketcham AS: Immunologic abnormalities in head and neck cancer. Am J Surg 128:534-538, Oct 1974

Additional Help for the Hearing Impaired

ADVANCES IN hearing aid design as well as new techniques and philosophy in hearing aid fittings have increased the number of patients who can benefit from amplification.

A patient with a high frequency loss, even when the hearing below 2000 Hz is normal or near normal, may have a great deal of difficulty in noisy situations and in distinguishing between